

REMARKS

In order to expedite the prosecution of the present application, Claim 1 has been amended to state that the polymerizable polysaccharide derivative has from 5 to 50% of polymerizable unsaturated groups based on the hydroxyl groups of the polysaccharide. Support for this amendment can be found on page 8 of the original specification. Newly presented Claim 15 requires that the polymerizable polysaccharide derivative have from 5 to 35% of polymerizable unsaturated groups. Support for this amendment also is found on page 8 of the original specification. Newly presented Claim 16 requires that the immobilization rate of the polysaccharide derivative is at least 90%. Support for this amendment is found in Tables 1 and 2 of the present specification. No new matter has been added.

Claims 1-3, 9, 10, 12 and 13 have been rejected under 35 USC 102(b) as anticipated by or, in the alternative, under 35 USC 103(a) as being obvious over either Kimata or Japanese Patent No. 4-202141 (JP '141) in view of PTO Translation No. 06-3034, with the translation serving as a translation for JP '141. Claim 3 has been rejected under 35 USC 103(a) as being unpatentable over either Kimata or JP '141 in view of Murakami. Claims 11 and 14 have been rejected under 35 USC 103(a) as being unpatentable over either Kimata or JP '141 in view of Oda. Applicants respectfully traverse these grounds of rejection and urge reconsideration in light of the following comments.

The presently claimed invention is directed to a separating agent for enantiomeric isomers which comprises a polymerizable polysaccharide derivative having from 5 to 50% of polymerizable unsaturated groups based on the hydroxyl groups of the polysaccharide, a polymerizable monomer having polymerizable unsaturated groups and a carrier having polymerizable functional groups. The polymerizable polysaccharide derivative, the polymerizable monomer and the carrier are copolymerized with each other to be chemically

bound mutually such that the immobilization rate of the polysaccharide derivative is at least 80%.

The present invention provides a separating agent which has both a high optical resolving ability and solvent resistance. The present invention is based on the discovery that when a separating agent is formed from a polysaccharide derivative having from 5 to 35% polymerizable unsaturated groups, a polymerizable monomer having polymerizable unsaturated groups and a carrier having polymerizable functional groups, and the polymerizable polysaccharide derivative, the polymerizable monomer and the carrier are copolymerized with one another to be chemically bound mutually so that the immobilization rate of the polysaccharide derivative is at least 80%, the carrier has both a high separating ability and a high solvent resistance. The high immobilization rate associated with the present invention results in superior separating abilities due to the high content of optical separation groups contained in the separating agent of the present invention. It is respectfully submitted that the prior art cited by the Examiner does not disclose the presently claimed invention.

The Kimata et al reference discloses an optical separating agent which is formed by polymerizing a polysaccharide derivative having vinyl groups introduced into the hydroxyl group thereof through an ester or urethane linkage on the surface of a porous support or by copolymerizing the polysaccharide derivative having vinyl groups introduced therein with a porous support having vinyl groups introduced therein. This reference does not disclose the presence of a polymerizable monomer during the copolymerization of the polysaccharide derivative having polymerizable functional groups with a carrier having polymerizable functional groups. Moreover, this reference has no suggestion why it would be advantageous to have a polymerizable monomer having polymerizable unsaturated groups take place in a copolymerization reaction between the polysaccharide derivative having polymerizable functional

groups and the carrier having polymerizable functional groups. As such, this reference clearly does not anticipate the presently claimed invention nor present a showing of prima facie obviousness under 35 USC 103(a).

JP '141 discloses an optical separating agent which is made up of a polysaccharide derivative having a vinyl group introduced at the hydroxyl group site through an ester or urethane linkage which is copolymerized with a vinyl group provided on a porous carrier. This reference has the identical disclosure of Kimata et al in that it has no suggestion of conducting the copolymerization reaction between the polysaccharide derivative having a vinyl group and the porous carrier having a vinyl group in the presence of a polymerizable monomer which participates in the copolymerization reaction. Additionally, like the previously discussed reference, this reference does not suggest why it would be advantageous to have a polymerizable monomer present during the copolymerization reaction between the polysaccharide derivative having the vinyl group and the carrier having the vinyl group. Therefore, like the previously discussed reference, this reference does not even present a showing of prima facie obviousness under 35 USC 103(a) with respect to the presently claimed invention.

The Murakami et al reference discloses a separating agent which is prepared by immobilizing a polysaccharide derivative on a support by cross-linking the polysaccharide derivative molecules exclusively among themselves on the support. Murakami has been cited by the Examiner as disclosing that the 6-position is a desirable location to link polysaccharides. However, this reference has no disclosure with respect to adding a polymerizable monomer to a copolymerization reaction between a polysaccharide derivative having polymerizable unsaturated groups and a carrier having polymerizable functional groups to obtain a product in which the polymerizable polysaccharide derivative, polymerizable monomer and carrier all copolymerize with each other to be chemically bound mutually such that the immobilization rate of the

polysaccharide derivative is at least 80%. Therefore, this reference adds nothing to the previously discussed references.

Oda et al discloses a packing material comprising a carrier coated with a substance having a separating capacity for high-performance liquid chromatography. This reference has been cited by the Examiner as disclosing that cellulose phenylcarbamate is commercialized and widely used because of its high optical resolving powers. However, like all of the previously cited references, Oda et al has no disclosure with respect to adding a polymerizable monomer to a polymerization reaction between a polysaccharide derivative having polymerizable unsaturated groups and a carrier having polymerizable functional groups in order to obtain a separating agent in which the immobilization rate of the polysaccharide derivative is at least 80%. As such, the references cited by the Examiner, either singularly or in any combination, do not even present a showing of prima facie obviousness under 35 USC 103(a) of the presently claimed invention.

Additionally, with respect to JP '141, this reference shows that a polysaccharide is replaced at its hydroxyl group only by a compound having a polymerizable unsaturated group. In the English translation thereof provided by the Patent Office, the paragraph bridging pages 4 and 5 states that it is not necessary to modify all three hydroxyl groups but only to modify them to the extent necessary that the modified product would be soluble in a good solvent such as methylene chloride. This means that almost all of the hydroxyl groups are modified with the compound having a polymerizable unsaturated group. In contrast thereto, the currently presented claims require that the polysaccharide derivative only have from 5 to 50% of polymerizable unsaturated groups. This disclosure of JP '141 would lead one of ordinary skill in the art away from the currently claimed requirement of 5 to 50% of polymerizable unsaturated groups in the polysaccharide derivative.

In the outstanding Office Action, the Examiner states that the presently claimed process steps and the process steps

of both Kimata and JP '141 are the same and, as such, the immobilization rate would appear to be the same. However, as discussed above, the process steps are not the same in that the present invention requires that the copolymerization reaction be conducted in the presence of a polymerizable monomer which also participates in the copolymerization reaction. In contrast thereto, neither Kimata nor JP '141 disclose a polymerizable monomer taking part in the copolymerization reaction disclosed there. The Examiner states that the last sentence of the second paragraph on page 7 of the translation of JP '141 discloses the use of monomers. However, this reference discloses the use of a cross-linking agent such as divinylbenzene, ethylenediamine dimethacrylate, ethylene glycol diacrylate, etc. and second and subsequent polymerization reactions. The cross-linking agents are not monomers in that they do not form polymers and do not participate in the copolymerization reaction as required by the present claims. As such, Applicants disagree with the Examiner's position that JP '141 discloses the use of monomers.

The Examiner has also stated that Kimata discloses, on column 5, lines 43-53, the use of monomers. As with the previously discussed reference, the vinyl group-containing compounds disclosed in column 5, lines 43-53, of Kimata are cross-linking agents and not monomers and do not participate in the copolymerization reaction as required by the present claims. As such, Applicants respectfully submit that the Kimata reference also does not disclose the use of monomers participating in a copolymerization reaction between the polysaccharide derivative having polymerizable unsaturated groups and the carrier having polymerizable functional groups as required by the present claims.

Although the Examiner has not made a showing of prima facie obviousness under 35 USC 103(a) of the presently claimed invention, objective evidence is of record in the present application which is more than sufficient to establish the patentability of the presently claimed invention. The

Examiner states in the outstanding Office Action that a comparison has not been made with the closest prior art. Applicants respectfully disagree with this statement. Comparative Example 2 in the present specification corresponds with the disclosures of Kimata and JP '141 in that the polysaccharide derivative containing a vinyl group was reacted with a porous carrier containing a vinyl group in the absence of a polymerizable monomer. This Example falls clearly within the disclosure of the primary references cited by the Examiner. As can be seen by comparison with Examples 1, 3 and 4, Comparative Example 2 only had an immobilization rate of 70% as compared to an immobilization rate of at least 90% with the present invention and as shown in Tables 1 and 2 of the present application, the separating agent of the present invention has superior separating properties as compared with those of Comparative Example 2. This is clearly unexpected in light of the disclosure of the references cited by the Examiner and establishes the criticality of the polymerizable monomer being present during the copolymerization reaction.

The Examiner is respectfully requested to reconsider the present application and to pass it to issue.

Respectfully submitted,


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